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Flex Control Network®

Model No. DC20 / DC21

DEVICE CONTROLLER

Rev 2 Hardware

User Manual

Rev. 1.04

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Revision History

101205	1.00	Original Document.
082107	1.01	Changed to Rev B hardware.
081409	1.02	Changed to Rev 2 hardware
042612	1.03	Updated connection diagram
061212	1.04	Added GPI and GPO WET / DRY sections

1. Getting Started

A. Installation

Install the DC20 Device Controller per instructions in the INSTALLATION and CONFIGURATION sections. This step is required only after initial installation.

This step will accomplish the following:

a) Physically install and wire the DC20.

b) Enter the IP, Subnet, and Gateway addresses and select the desired Ethernet speed.

B. Configuration

Configure the DC20 per instructions in the SETUP section.

This step is required after initial installation. This step may be performed at any time, as required.

This step will accomplish the following:

a) Set user selected password.

b) Set the system label to uniquely identify this DC20 Device Controller.

2. Installation

CAUTION

Do NOT apply AC voltage to power supply, and then connect power supply to DC20 Device Controller. Component damage may occur.

1) Connect Cat 5 cable to DC20 connector labeled “E-NET #1”. Connect other end of Cat 5 cable to customer supplied Ethernet hub.

2) Plug one end of a standard 9-conductor, RS422 serial cable into the Serial Port #1 connector on the rear of the DC20.

3) Plug the other end of the 9-conductor, RS422 serial cable into the remote control connector on the VTR, DDR, or Video Server. Repeat steps 2 and 3 for each serial port to be used for machine control.

4) Connect facility video reference to REF video connector on rear of DC20. This is required for accurate play timing.

5) Connect facility time-of-day LTC to LTC Input Connector on rear of DC20. This is required for accurate gang synchronization.

6) Connect power supply DB9 female connector to DC20 connector labeled “POWER“.

7) Connect female side of power cable to supplied power supply.

8) Connect male side of power cable to AC voltage, 100 – 240.

9) Push DC20 power switch, located on front panel, to ON position. The “O” on the power switch is the OFF position.

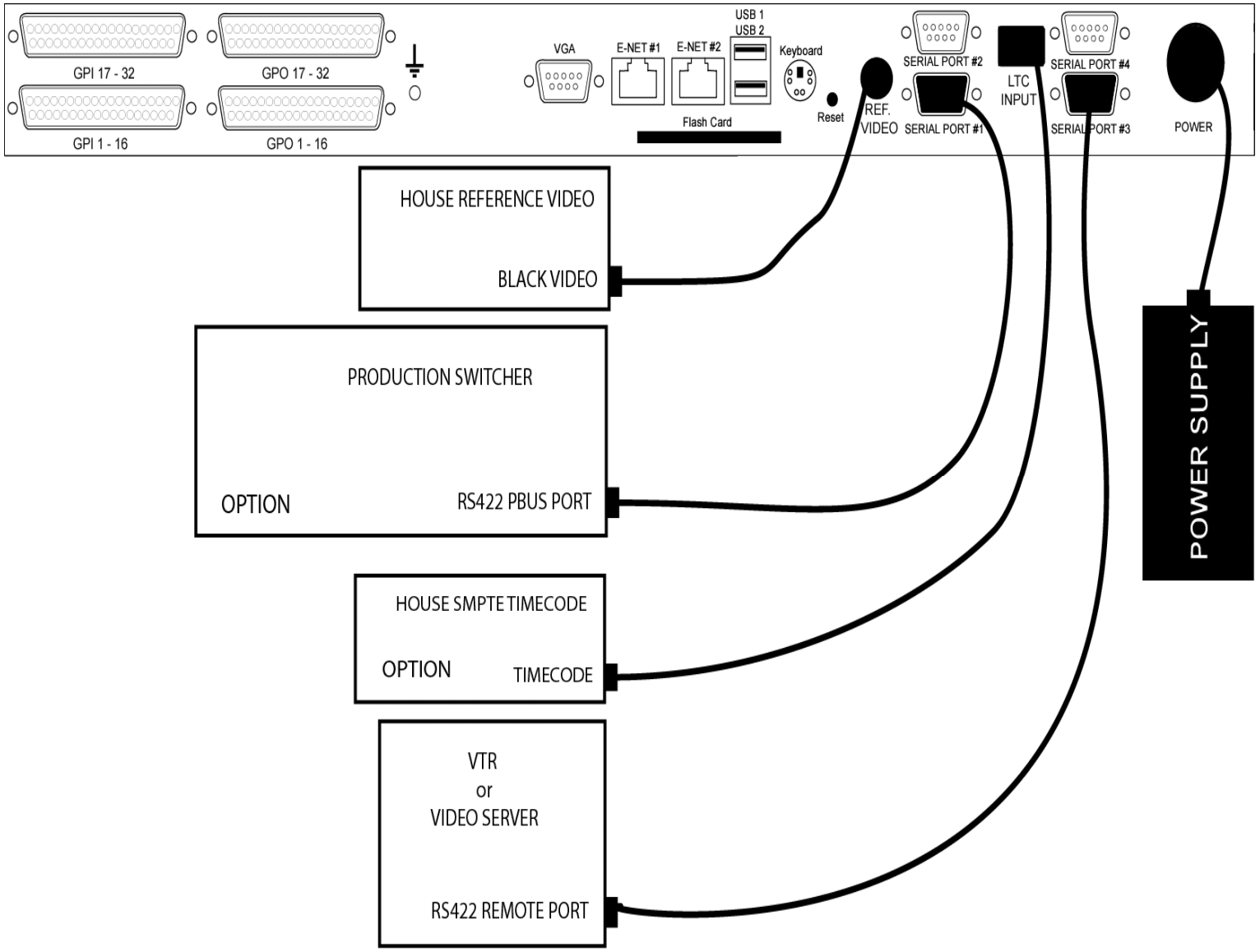
10) Front panel LEDs will flash during power up. When power up and system initialization completes, the front panel LEDs will turn off and the front panel display will show Model Number and Software Version. Allow 25 seconds for power up and system initialization to complete.

No connection is required to the DIAGNOSTIC or VGA connectors on the rear of the DC20.

CAUTION

Do NOT apply AC voltage to power supply, then hot plug power supply to DC20 Device Controller. Component damage may occur.

3. Connection Diagram



4. CONFIGURATION

Configuration is required after initial installation.

A. IP Address Setup

1) On the DC20 front panel, use ↑↓ keys to select “Current IP”.
2) Press ENTER key. Display will show current IP address with cursor in far left column.
3) Use the ↑↓ keys to change number.

   Use ← → keys to move cursor position.
4) Press ENTER to save new IP address.

   OR

   Press ESC to exit without saving.

   NOTE- New IP Address will take effect on next power up.

B. Subnet Mask Setup

1) On the DC20 front panel, use ↑↓ keys to select “Current Mask”.
2) Press ENTER key. Display will show current Subnet Mask with cursor in far left column.
3) Use the ↑↓ keys to change number.

   Use ← → keys to move cursor position.
4) Press ENTER to save new Subnet Mask.

   OR

   Press ESC to exit without saving.

   NOTE- New Subnet Mask will take effect on next power up.

C. Gateway Address Setup

1) On the DC20 front panel, use ↑↓ keys to select “Current Gateway”.
2) Press ENTER key. Display will show current Gateway address with cursor in far left column.
3) Use the ↑↓ keys to change number.

   Use ← → keys to move cursor position.
4) Press ENTER to save new Gateway address.

   OR

   Press ESC to exit without saving.

   NOTE- New Gateway Address will take effect on next power up.

D.Ethernet Link Speed Setup

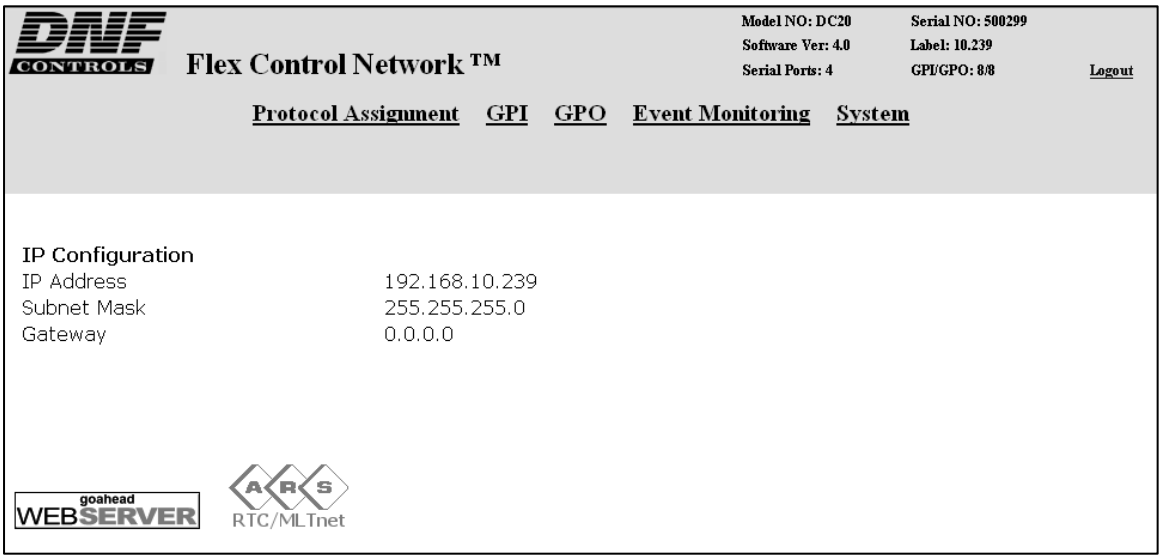
1) On the DC20 front panel, use ↑↓ keys to select “Ethernet Status”.
2) Press ENTER key. Display will show current speed selection.
3) Use the ↑↓ keys to change selection.
   Select AUTO to use highest available speed.
   Select 10Mbs for long Ethernet cable runs.
4) Press ENTER to save new IP address.
   OR
   Press ESC to exit without saving.
   NOTE- New Ethernet speed selection will take effect immediately.

5. SETUP

Setup is required after initial installation. This step may be performed at any other time, as required.

Setup is performed using a computer running an off-the-shelf web browser such as “Microsoft Internet Explorer” or “Netscape”. Connect the CAT5 cable from the computer to the same Ethernet hub that the DC20 Device Controller is connected to.

After launching the web browser, enter the IP address of the DC20 to be setup. The DC20 Home Page will be displayed.



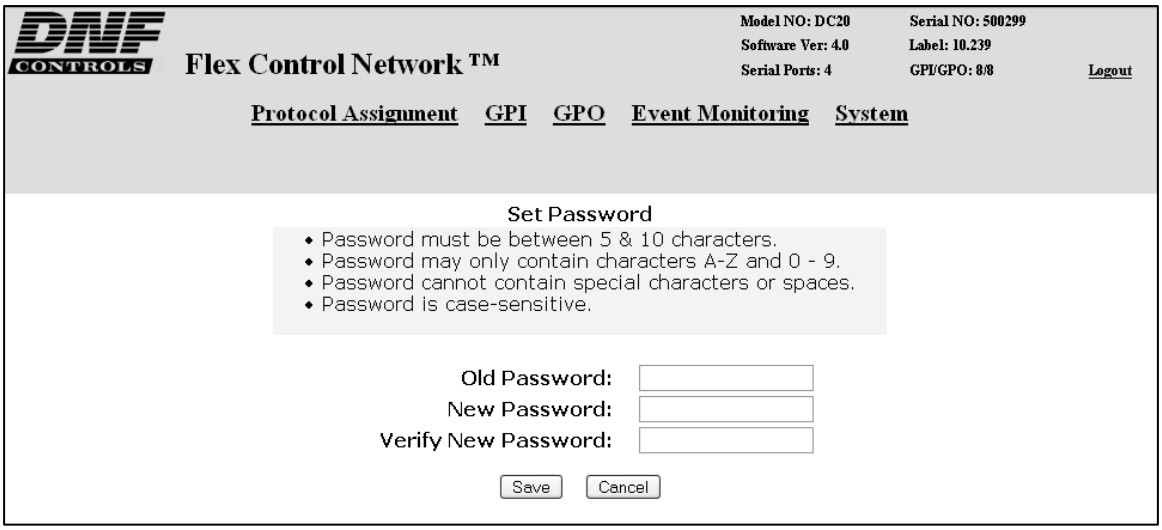
A. Set Password

The default password, when shipped from the factory, is “controls”, all lower case. The password is used to access all configuration screens.

Using the web browser-

1) From the DC20 Home Page, click on the “System” link. The System page will be displayed.

2) Click on “Set Password”. The Set Password page will be displayed.



3) In the “Old password” entry box, enter the current password.

Note- When shipped from the factory, the default password is “controls”, all lower case.

4) Enter the new password in the “New Password” entry box.

5) Enter the new password in the “Verify New Password” entry box.

6) Click on “Save” to save the new password.

OR, click on “Cancel” to exit without changing passwords.

Note- If the “New Password” entry and the “Verify New Password” entry do not match, an error will be displayed.

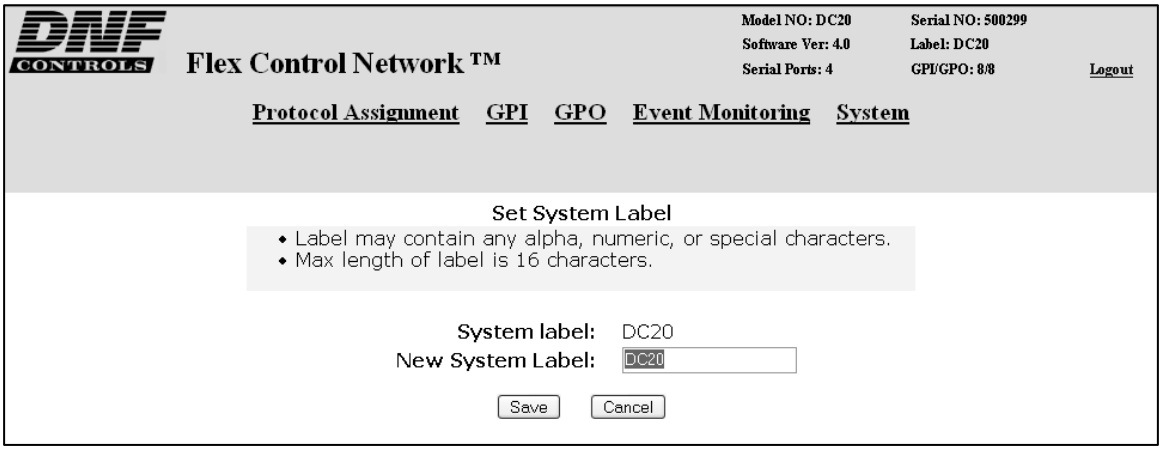
B. Set System Label

The System Label is used to uniquely identify a DC20. This name is associated with the IP address.

Using the web browser-

1) From the DC20 Home Page, click on the “System” link. The System page will be displayed.

2) Click on “Set System Label”. The Set System Label page will be displayed.



3) Enter any name made up of letters, numbers, or special characters, up to 16 characters.

4) Click on “Save” to save the name entered in step 3).

OR, click on “Cancel” to exiting without changing the System Label.

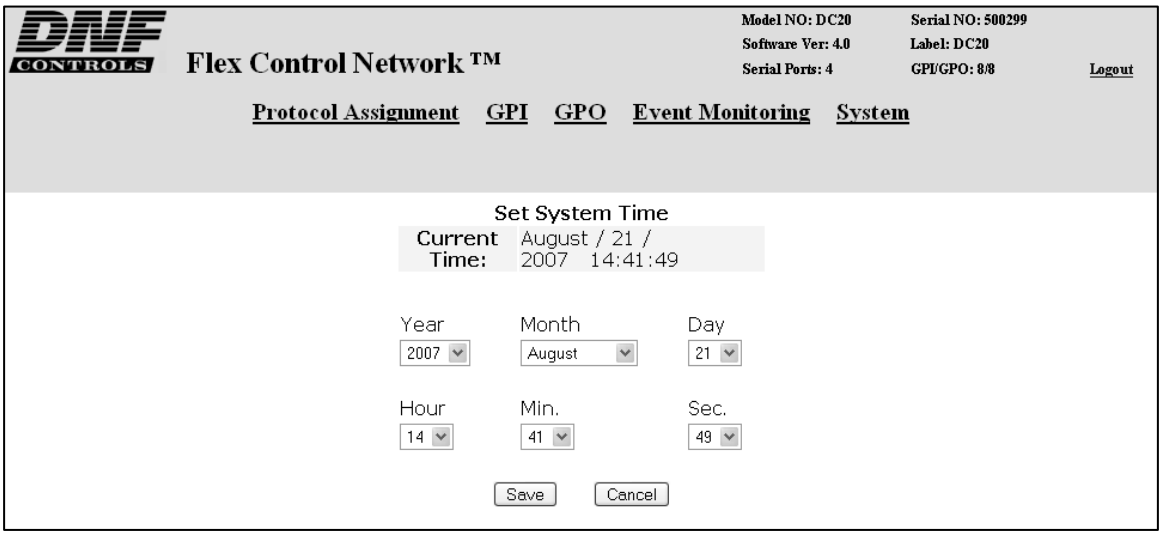
C. Set System Time

The system time is only used for error and event time stamping.

Using the web browser-

1) From the DC20 Home Page, click on the “System” link. The System page will be displayed.

2) Click on “Set System Time”. The Set System Time page will be displayed.



3) Using the drop down menus, set the current date and time.

4) Click on “Save” to save the entered date and time.

OR, click on “Cancel” to exit without saving.

D. Additional Setups

No additional setups are required in “Event Diagnostic” or “System Maintenance” for normal operation. The LOGOUT link is used to log out of the DC20 thereby disallowing any changes that are password protected.

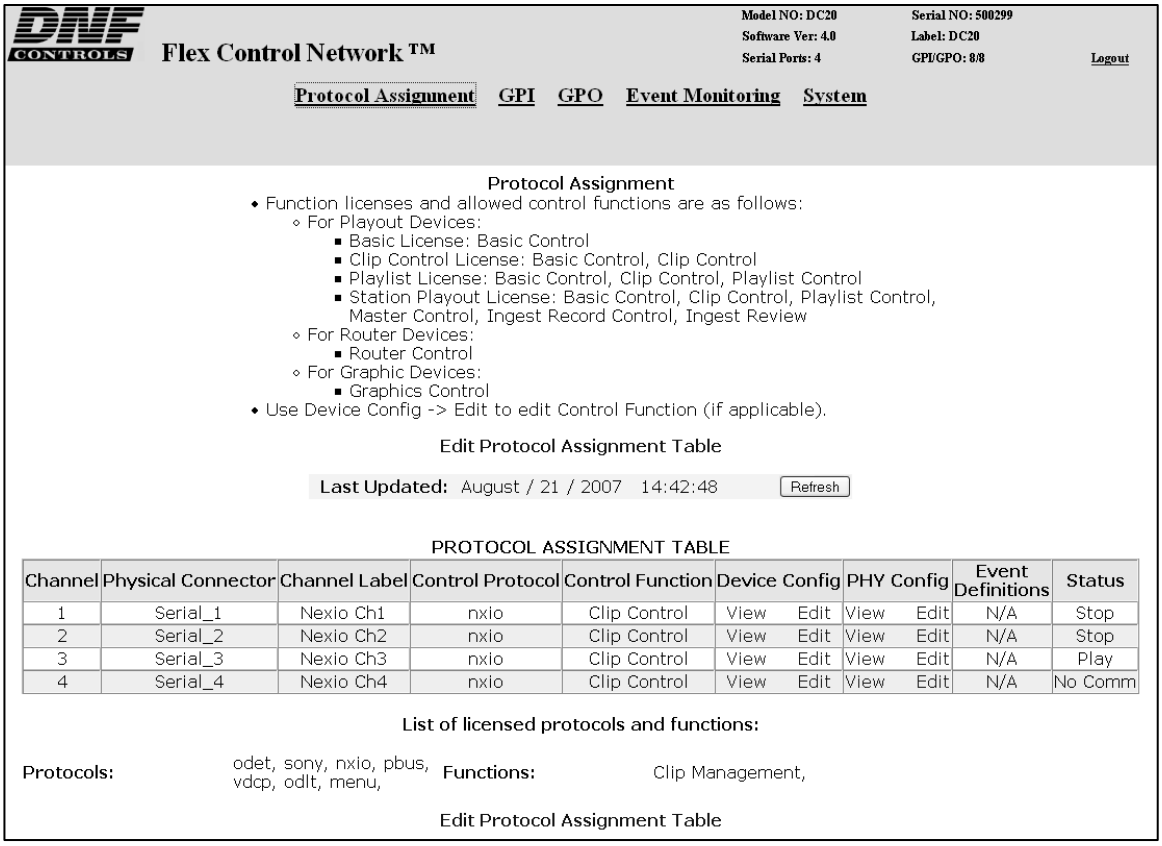
6. SERIAL CHANNEL SETUP

Serial Channel Setup is required after initial installation. This step may be performed at any other time, as required.

Serial Channel Setup is performed using a computer running an off-the-shelf web browser such as “Microsoft Internet Explorer” or “Netscape”. Connect the CAT5 cable from the computer to the same Ethernet hub that the DC20 Device Controller is connected to.

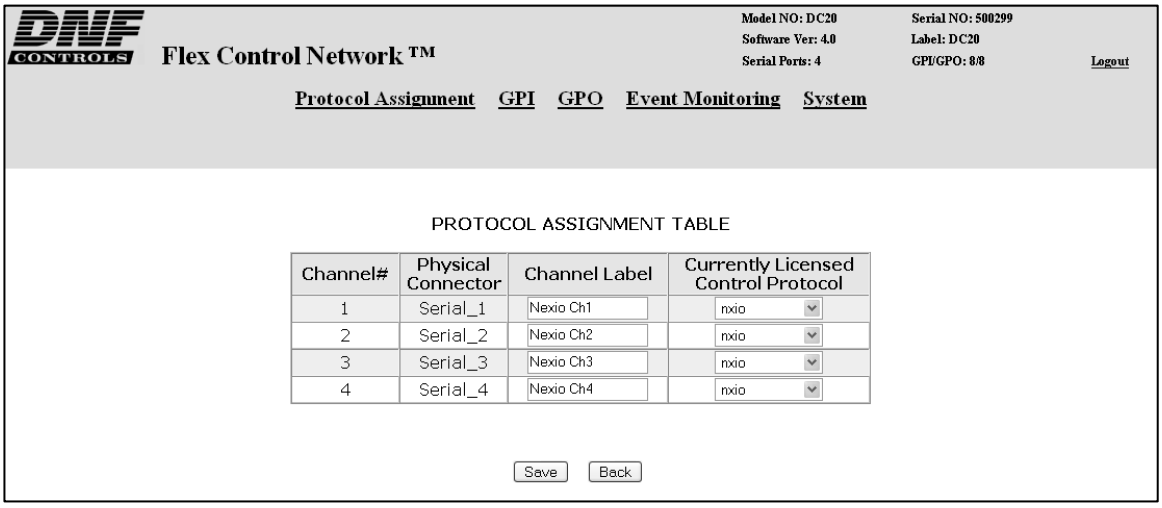
a. After launching the web browser, enter the IP address of the DC20 to be setup. The DC20 Home Page will be displayed.

b. Click on the “Protocol Assignment” link at the top of the page. The Protocol Assignment Table will be displayed.


Flex Control Network ™
Model NO: DC20
Serial NO: 500299
Software Ver: 4.0
Label: DC20
Serial Ports: 4
GPI/GPO: 8/8
Logout
Protocol Assignment
GPI
GPO
Event Monitoring
System
Protocol Assignment
Function licenses and allowed control functions are as follows:
For Playout Devices:
Basic License: Basic Control
Clip Control License: Basic Control, Clip Control
Playlist License: Basic Control, Clip Control, Playlist Control
Station Playout License: Basic Control, Clip Control, Playlist Control, Master Control, Ingest Record Control, Ingest Review
For Router Devices:
Router Control
For Graphic Devices:
Graphics Control
Use Device Config -> Edit to edit Control Function (if applicable).
Edit Protocol Assignment Table
Last Updated: August / 21 / 2007 14:42:48
Refresh
PROTOCOL ASSIGNMENT TABLE
Channel
Physical Connector
Channel Label
Control Protocol
Control Function
Device Config
PHY Config
Event Definitions
Status
1 Serial_1 Nexio Ch1 nxio Clip Control View Edit View Edit N/A Stop
2 Serial_2 Nexio Ch2 nxio Clip Control View Edit View Edit N/A Stop
3 Serial_3 Nexio Ch3 nxio Clip Control View Edit View Edit N/A Play
4 Serial_4 Nexio Ch4 nxio Clip Control View Edit View Edit N/A No Comm
List of licensed protocols and functions:
Protocols:
odet, sony, nxio, pbus, vdcp, odlt, menu,
Functions:
Clip Management,
Edit Protocol Assignment Table

A. Serial Protocol Assignment

1) Click on “Edit Protocol Assignment Table”. An editable version of the table will be displayed.



2) For each channel, enter a channel identifier (up to 20 characters) in the “Channel Label” box.

3) For each channel, select from the Licensed Control Protocol drop down menu.

4) Click on “SAVE” to save the entered values

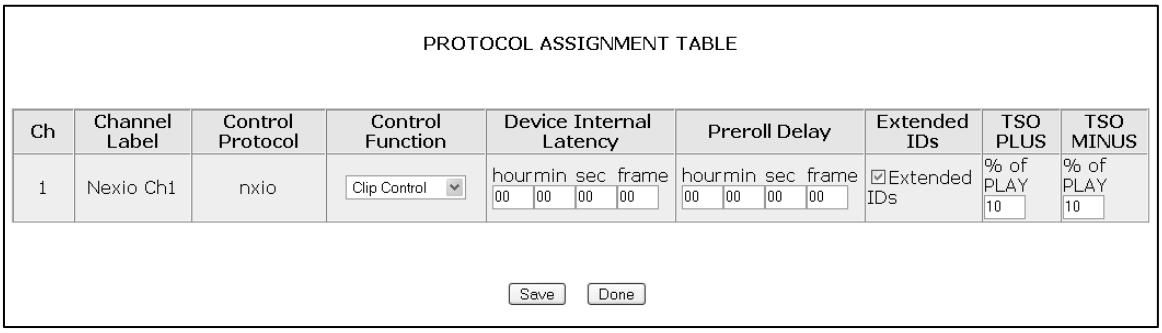
OR

Click on “BACK” to exit without saving entered values.

B. Serial Device Configuration

1) Click on the “Protocol Assignment” link at the top of the page. The Protocol Assignment Table will be displayed.

2) Click on “Edit” field under the "Device Configuration". An edit widow will be displayed.


PROTOCOL ASSIGNMENT TABLE
Ch Channel Label Control Protocol Control Function Device Internal Latency Preroll Delay Extended IDs TSO PLUS TSO MINUS
1 Nexio Ch1 nxio Clip Control hour min sec frame 00 00 00 00 hour min sec frame 00 00 00 00 Extended IDs % of PLAY 10 % of PLAY 10
Save
Done

3) Click on drop down arrow field under the "Control Functions" field and chose the control functionality (depending on licensed protocols).

4) Enter the "Device Latency" (the amount of time the server takes to react to commands, typically 1 to 2 seconds).

5) VDCP protocol requires that a channel number be assigned. This is the channel number assigned by the server.

6) Check the "Extended IDs" box if the server allows greater than 8 character clip names.

7) Enter the "TSO" (tape speed override) value, 25% Maximum.

8) Click on “SAVE” to save the entered values

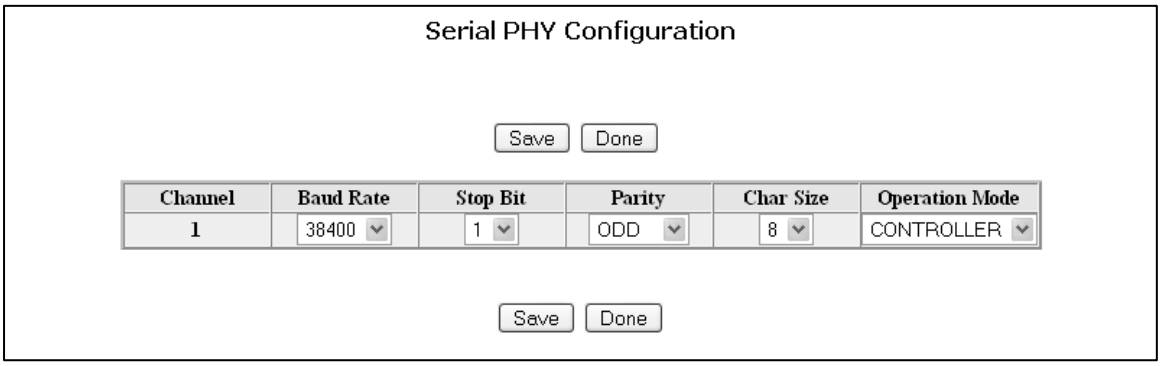
OR

Click on “BACK” to exit without saving entered values.

C. Serial Physical Configuration

1) Click on the “Protocol Assignment” link at the top of the page. The Protocol Assignment Table will be displayed.

2) Click on “Edit” field under the "PHY Configuration". An edit widow will be displayed.



3) Click on drop down arrow field under the "Baud Rate" field and chose the Baud rate for the communications protocol of the device which is connected to the DC20 (typically "38400" for all protocols; Sony, Odet, VDCP, NXIO).

4) Click on drop down arrow field under the "Stop Bit" field and chose the number of stop bits for the communications protocol of the device which is connected to the DC20 (typically "1" for all protocols; Sony, Odet, VDCP, NXIO).

5) Click on drop down arrow field under the "Parity" field and chose the number of stop bits for the communications protocol of the device which is connected to the DC20 (typically "ODD" for all protocols; Sony, Odet, VDCP, NXIO).

6) Click on drop down arrow field under the "Char Size" field and chose the number of data bits for the communications protocol of the device which is connected to the DC20 (typically "8" for all protocols; Sony, Odet, VDCP, NXIO).

7) Click on drop down arrow field under the "Operation Mode" field and chose the mode of operation for the communications protocol of the device which is connected to the DC20 (typically "CONTROLLER" for all protocols; Sony, Odet, VDCP, NXIO).

8) Click on “SAVE” to save the entered values

OR

Click on “BACK” to exit without saving entered values.

7. DIAGNOSTICS

Diagnostics provides a quick and easy method to test and validate system operation of the DC20. Use diagnostics to confirm Ethernet connection to the CP20 control panel.

Launch the web browser on the computer connected through an Ethernet hub to the DC20. Most off-the-shelf web browsers, like Microsoft Internet Explorer or Netscape, may be used.

A. IP Diagnostics

a. Enter the IP address of the DC20 to be checked. The DC20 Home Page will be displayed.

b. Click on the “System” link. The System page will be displayed.

c. Click on the “Diagnostics” link. The Diagnostic page will be displayed.

d. Click on the “IP Diagnostics” link. The IP Diagnostic page will be displayed.

e. The display will show one IP Address entry box. Click” Add Entry” or “Remove New Entry“to add or remove IP entry boxes as needed. One entry box is required for each IP address.

f. Manually enter the IP address (es) of the DC20 to test.

g. Click “Check All” to check the status of all displayed DC20 addresses.

   OR

   Click the check box to check the status of a specific DC20.

h. Click the “Check” button to start the test

   OR

   Click “Cancel” to abort the IP Diagnostic test.

i. After all selected DC20 s have been tested, the results will be displayed.

   Click on “Back” to return to the previous page.

   OR

   Click on “Refresh” to recheck the status of the displayed IP addresses.

B. Event Logs

The display will show a list of fourteen files. There are two files for each day of the week. Each file has the capacity of about 2 Megs of data. When the first file gets full the system starts recording to the second file. If the second file were to get full the system will start recording back on the first file overwriting the previous data. At midnight the system starts recording on the next day's file overwriting any previous data. It is up to the operator to back-up these files if they need to be retained for any reason.

a. Enter the IP address of the DC20 to be checked. The DC20 Home Page will be displayed.

b. Click on the “System” link. The System page will be displayed.

c. Click on the “System Maintenance” link. The System Maintenance page will be displayed.

d. Click on the “View Event Logs” link. The "Event Log File List" page will be displayed. The display will show a list of fourteen files.

e. Click the radio button to select the file you want to view and then click the "View File" button to view the file.

f. Click the back button to return to the "Event Log File List"

g. To save a file to the PC that is running the Browser Program, Right Click on the file name and follow the "Windows" instruction as to where to save the file.

C. Trace Logs

These files are for diagnosing specific problems under the direction of the DNF customer support person. The person will direct you as to which traces to activate and how to retrieve the file for factory review.

8. FRONT PANEL MENU

Menu Item#	Menu Item		Notes
↑ or ↓	← or →		
1	Model Number Version	n/a	Displays Model Number & Software Version
2	GPIOS Serial Ports	n/a	Displays number of GPIs, GPOs, and Serial Ports
3	Label	n/a	Displays user assigned name up to 16 characters
4	Time and Date	n/a	Displays the internal time and date.
5	View Current IP Address	View New IP Address	Press ENTER to enter new IP address. Use ↑↓ keys to change number. Use ← → keys to move cursor. Press ENTER to save new IP address. OR Press ESC to exit without saving. NOTE- New IP Address will take effect on next power up.
6	View Current Subnet Mask	View New Subnet Mask	Press ENTER to enter new Subnet Mask. Use ↑↓ keys to change number. Use ← → keys to move cursor. Press ENTER to save new Subnet Mask. OR Press ESC to exit without saving. NOTE- New Subnet Mask will take effect on next power up.

Menu Item#	Menu Item		Notes
↑ or ↓	← or →		
7	View Current Gateway Address	View New Gateway Address	Press ENTER to enter new Gateway Address. Use ↑↓ keys to change number. Use ← → keys to move cursor. Press ENTER to save new Gateway Address. OR Press ESC to exit without saving. NOTE- New Gateway Address will take effect on next power up.
8	Channel Status	View Protocol and channel label	Displays channel 1-4 channel status and timecode.
9	View Ethernet Status: 10Mbs or 100Mbs Link Up or Down	n/a	Link status is updated automatically every second. Press ENTER to change Link Speed. Use ↑↓ keys to select AUTO or 10Mbs. Select AUTO to use highest available speed. Select 10Mbs for long cable runs. Press ENTER to save selection OR Press ESC to exit without saving.
10	GPI State Snapshot	View GPI bank 1-8, 9-16, 17-24, 25-32	Displays GPI activity.
11	View LTC and UB data	n/a	Displays Timecode values and User Bits Data

9. FRONT PANEL DIAGNOSTICS

From the front panel of the DC20, quickly view the current Ethernet status. Refer to Section 0, menu item #9.

On the front panel, use the ↑ or ↓ keys to step to the “View Ethernet Status” display on the front panel display.

The display will show the current link status:

10Mbs or 100Mbs

Link Up or Link Down

The link status display is updated automatically every second.

10. SPECIFICATIONS

Power: 100 VAC - 240 VAC power supply, Phihong PSAA60M, supplied with IEC connector

Size: 1RU: 1 3/4 inch x 19 inch x 8 1/2 inch (H.W.D.)

Weight: 7 lbs

Front Panel Display: 2 line x 16 character

Front Panel Keyboard: 8 keys with LEDs

LTC: 3 pin Phoenix Connector

Balanced:

Pin 1 = LTC HI
Pin 2 = LTC LOW
Pin 3 = Common/Shield

Unbalanced:

Pin 1 = LTC HI
Pin 2 = Tie to Pin 3
Pin 3 = Shield

VGA Port: D15HDF connector

E – Net #1: RJ45 Connector

E – Net #2: RJ45 Connector Not Used

USB #1: USB "A" socket Connector Not Used

USB #2: USB "A" socket Connector Not Used

REF Video: BNC Connector, Female

Power Connector: 9-Pin Male (D9M)

Pin #	Function
1	Not Connected
2	+15-28V
3	Ground
4	Not Connected

Serial Port 1, 2, 3, 4: 9-Pin Female (D9F)

Pin #	Function	Pin #	Function
1	Frame Ground	6	Transmit Common
2	Receive A (-)	7	Receive B (+)
3	Transmit B (+)	8	Transmit A (-)
4	Receive Common	9	Frame Ground
5	Spare		

RS232 Port: 9-Pin Female (D9F)

Pin #	Function	Pin #	Function
1	DCD	6	DSR
2	Rxd	7	RTS
3	Txd	8	CTS
4	DTR	9	RI
5	Ground		

GPIO CONNECTORS: (DC21 Only)

GPI 1 – 16, GPI 17 – 32, GPO 1 – 16, GPO 17 - 32; 4 x 37-Pin Female (D37F)

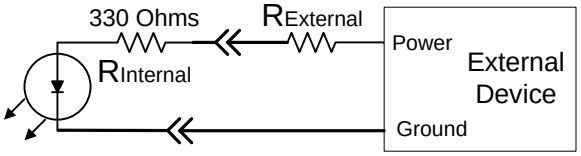
GPI: Opto Isolated Input. GPI source must provide power to turn on opto-isolator.

GPI Opto-isolator Input:

5V - 12 V input voltage

24V use external resistor = 680 - 820 ohm

20ma MAXIMUM CURRENT



Specification for GPI input:

1. Voltage: (Internal resistor only)
   - +3.3V minimum
   - +5V typical
   - +6V maximum
2. Current: (Internal resistor only)
   - 5mA minimum
   - 10mA typical
   - 15mA maximum

For typical 10mA current, if external voltage is higher than +5V, a series resistor is required:

$R_{ext} = (V_{ext} - 4.5) / 0.01$

V_{ext} = +9V => R_{ext} = 450 Ohms

V_{ext} = +12V => R_{ext} = 750 Ohms

V_{ext} = +24V => R_{ext} = 1950 Ohms

Pin #	Function	Pin #	Function
1	Ground	20	Ground
2	GPI #1 Anode (+)	21	GPI #1 Cathode (-)
3	GPI #2 Anode (+)	22	GPI #2 Cathode (-)
4	GPI #3 Anode (+)	23	GPI #3 Cathode (-)
5	GPI #4 Anode (+)	24	GPI #4 Cathode (-)
6	GPI #5 Anode (+)	25	GPI #5 Cathode (-)
7	GPI #6 Anode (+)	26	GPI #6 Cathode (-)
8	GPI #7 Anode (+)	27	GPI #7 Cathode (-)
9	GPI #8 Anode (+)	28	GPI #8 Cathode (-)
10	Ground	29	Ground
11	GPI #9 Anode (+)	30	GPI #9 Cathode (-)
12	GPI #10 Anode (+)	31	GPI #10 Cathode (-)
13	GPI #11 Anode (+)	32	GPI #11 Cathode (-)
14	GPI #12 Anode (+)	33	GPI #12 Cathode (-)
15	GPI #13 Anode (+)	34	GPI #13 Cathode (-)
16	GPI #14 Anode (+)	35	GPI #14 Cathode (-)
17	GPI #15 Anode (+)	36	GPI #15 Cathode (-)
18	GPI #16 Anode (+)	37	GPI #16 Cathode (-)
19	Ground		

GPO: Relay Contact Closure Output. “Dry” contact closure.

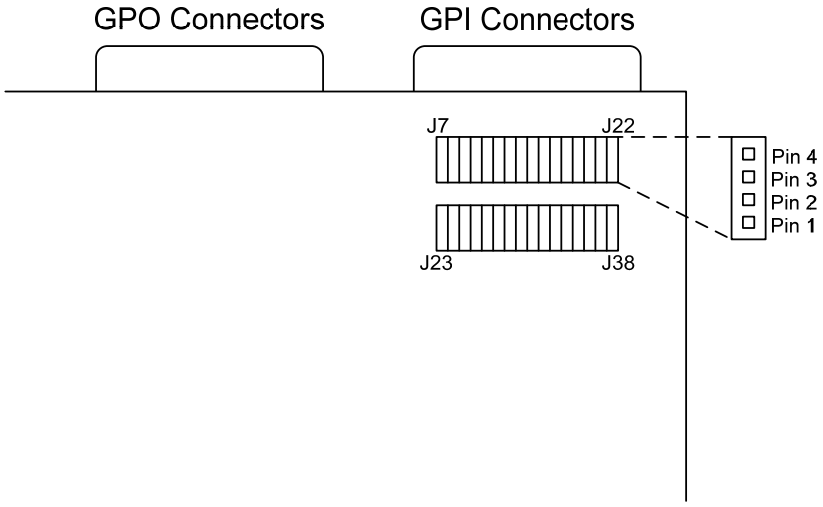
GPO Relay Contacts:
0.5 A @ 125VAC
1.0 A @ 24VDC
1.0 A MAXIMUM CURRENT

Pin #	Function	Pin #	Function
1	Common Bus	20	Ground
2	GPO #1 N.O.	21	GPO #1 COMMON
3	GPO #2 N.O.	22	GPO #2 COMMON
4	GPO #3 N.O.	23	GPO #3 COMMON
5	GPO #4 N.O.	24	GPO #4 COMMON
6	GPO #5 N.O.	25	GPO #5 COMMON
7	GPO #6 N.O.	26	GPO #6 COMMON
8	GPO #7 N.O.	27	GPO #7 COMMON
9	GPO #8 N.O.	28	GPO #8 COMMON
10	Common Bus	29	Ground
11	GPO #9 N.O.	30	GPO #9 COMMON
12	GPO #10 N.O.	31	GPO #10 COMMON
13	GPO #11 N.O.	32	GPO #11 COMMON
14	GPO #12 N.O.	33	GPO #12 COMMON
15	GPO #13 N.O.	34	GPO #13 COMMON
16	GPO #14 N.O.	35	GPO #14 COMMON
17	GPO #15 N.O.	36	GPO #15 COMMON
18	GPO #16 N.O.	37	GPO #16 COMMON
19	Common Bus		

11. CONFIGURE GPIS FOR DRY / WET OPERATION

GPIs are set to Dry operation by default. The GPIs may be set for Wet mode using either a GTP-32 Breakout Panel or using jumpers within the GTP-32. To configure the jumpers inside the GTP-32:

1) Power down the GTP-32.
2) Using a Phillips screwdriver, remove the top cover from the GTP-32. To do so, you will need to remove 3 screws from each side of the unit, 2 from the rear, and 1 from the center of the front of the unit.
3) The GPIO card is on the far right hand side of the unit (if facing the front panel), behind the GPIO connectors.
4) The jumpers for the GPIs are directly behind the GPI connectors, labeled J7 through J38. Each set of jumpers for a GPI consists of 4 pins. See the table below for which GPI corresponds to which jumpers.



5) For Dry operation, set one jumper across pins 2 and 3. Hang the second jumper off of pin 1.
6) For Wet operation, set one jumper across pin 1 and 2. Set the second jumper across pins 3 and 4.
7) Once all necessary changes to the jumpers have been made, replace the top cover and screws on the GTP-32.

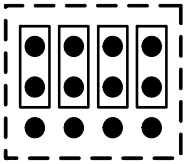
GPI	Jumper
1	J7
2	J8
3	J9
4	J10
5	J11
6	J12
7	J13
8	J14
9	J15
10	J16
11	J17
12	J18
13	J19
14	J20
15	J21
16	J22
17	J23
18	J24
19	J25
20	J26
21	J27
22	J28
23	J29
24	J30
25	J31
26	J32
27	J33
28	J34
29	J35
30	J36
31	J37
32	J38

12. CONFIGURE GPOS FOR DRY / WET OPERATION

Note: Signal connected to Common Bus is isolated from GTP/DC electronics & power supply.

NOTE:
GPO Jumpers located inside GTP-32

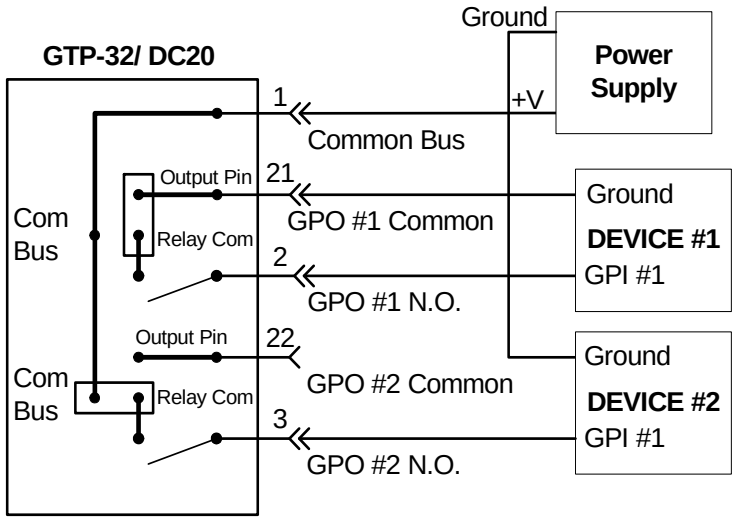
Factory Default configuration shown



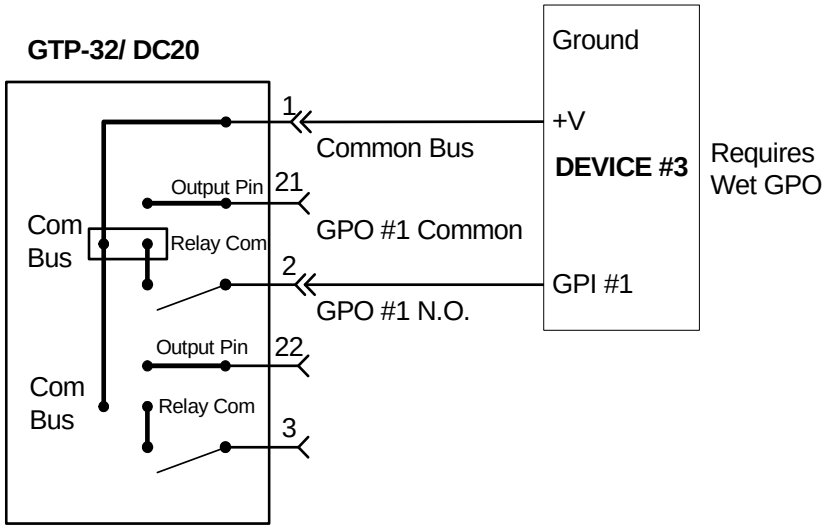
(Viewed from front of unit)

JUMPER	GPO
J40	1
J41	2
J42	3
J43	4
J44	5
J45	6
J46	7
J47	8
J48	9
J49	10
J50	11
J51	12
J52	13
J53	14
J54	15
J55	16
J56	17
J57	18
J58	19
J59	20
J60	21
J61	22
J62	23
J63	24
J64	25
J65	26
J66	27
J67	28
J68	29
J69	30
J70	31
J71	32

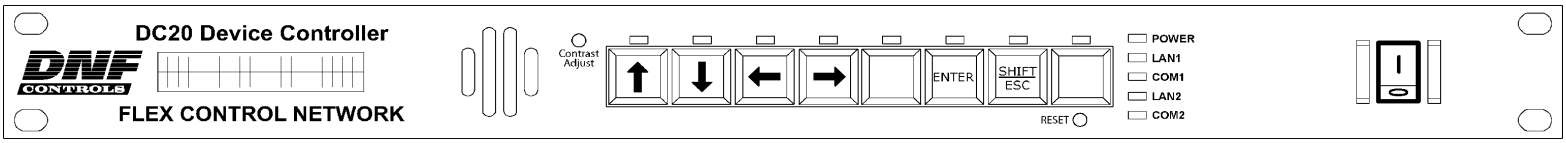
EXAMPLE #1- External Power Supply to wet GPOs



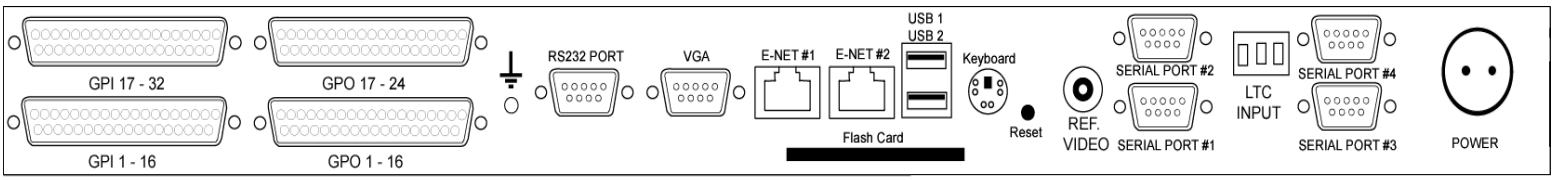
EXAMPLE #2- Device supplied power to wet GPOs



13. FRONT & REAR VIEWS



Front View



Rear View

14. DNF Controls Limited Warranty

DNF Controls warrants its product to be free from defects in material and workmanship for a period of one (1) year from the date of sale to the original purchaser from DNF Controls.

In order to enforce the rights under this warranty, the customer must first contact DNFs Customer Support Department to afford the opportunity of identifying and fixing the problem without sending the unit in for repair. If DNF's Customer Support Department cannot fix the problem, the customer will be issued a Returned Merchandise Authorization number (RMA). The customer will then ship the defective product prepaid to DNF Controls with the RMA number clearly indicated on the customer's shipping document. The merchandise is to be shipped to:

DNF Controls
12843 Foothill Blvd., Suite C
Sylmar, CA 91342
USA

Failure to obtain a proper RMA number prior to returning the product may result in the return not being accepted, or in a charge for the required repair.

DNF Controls, at its option, will repair or replace the defective unit. DNF Controls will return the unit prepaid to the customer. The method of shipment is at the discretion of DNF Controls, principally UPS Ground for shipments within the United States of America. Shipments to international customers will be sent via air. Should a customer require the product to be returned in a more expeditious manner, the return shipment will be billed to their freight account.

This warranty will be considered null and void if accident, misuse, abuse, improper line voltage, fire, water, lightning or other acts of God damaged the product. All repair parts are to be supplied by DNF Controls, either directly or through its authorized dealer network. Similarly, any repair work not performed by either DNF Controls or its authorized dealer may void the warranty.

After the warranty period has expired, DNF Controls offers repair services. Equipment is evaluated and repair price quoted prior to any work performed. DNF Controls reserves the right to refuse repair of any unit outside the warranty period that is deemed non-repairable.

DNF Controls shall not be liable for direct, indirect, incidental, consequential or other types of damage resulting from the use of the product.